Appendix B

Concrete Forms

IC 739 sta. Four, 11107

INDIANA DEPARTMENT OF HIGHWAYS
CONCRETE PLANT INSPECTOR'S DAILY CHECK LIST

DISTRIBUTION: Project Engineer

BATCH WEIGHTS

ADMIXTURE: TYPE_____ Amt._____oz

CA_____ lb. FA_____lb. C_____lb.

MAXIMUM WATER PER CYD._____gal.

CONTRACT NO._____ PROJECT NO_____ DATE_____

PLANT NAME_____ LOCATION_____

	YES	NO
1. Has the plant been approved by Div. of Materials & Tests?		
2. Are heating facilities available if required?		
3. Are sufficient approved materials available for the pour?		
4. Are aggregates stockpiled properly and separately?		
5. Are aggregates maintained separately in the bins?		
g, Are aggregates free of contamination?		
7. Has aggregate had 12 hour drainage?		
8. Is the cement storage weather tight?		
9. Are records of cement shipments being kept?		
10. Is there an adequate cement sampling port available?		
11. Are there sufficient material samples to comply with Frequency Requirements?		
12. Does the mixer have manufacturer information plate attached?		
13. Is the mixer being used at or below rated capacity?		
14. Is the mixer timer working properly and at the required setting?		
15. Is the air entraining admixture dispenser working properly and accurately?		
16. Are other chemical admixture dispensers working properly and accurately?		
17. Have batch weights been checked by the Project Engineer or Supervisor?		
18. Are (10) 50 pound test weights available for checking scales?		
19. Have the scales been checked twice daily during operation for cleanliness, material buildup and "no load" balance?		
20. Is the cement handled to avoid spillage after weighing?		
21. Are accurate records of all batches weighed being kept?		
22. Is the project being furnished a record of any batch changes on the individual concrete load when the change occurs?		

		YES	NO
23.	Do all trucks have working revolution counters? Any truck that does not have a properly working revolution counter will not be used.		
24.	Do all trucks have manufacturer's information plates? Manufacturer's tags must be in place before truck can be used. Drum revolution shall be checked for compliance with manufacturer's recommendations.		
25.	Is general condition of truck good? Trucks shall be checked for water storage (capacity, leaky valves, etc.), old concrete buildup, and general condition?		
26.	Are trucks being used at or below rated capacity?		
27.	Is truck free of concrete and wash water from previous loads?		

NOTE: If "NO" is checked for any of the above items, list under REMARKS the action taken to correct the situation. Any question that does not apply to the type of mixer used shall be marked DNA.

TRUCKS USED FOR POUR

Truck Number	Mfgr's Tags	Rev. Counter	General Cond.

CONCRETE POUR CHANGES (CENTRAL MIX & TRANSIT MIX)

Truck Number	Mfgr's Tags	Time	Total Yds. This Date	Change Made

REMARKS:

SIGNED: _____

_____

Water/Cement Ratio Test

To perform a Water/Cement Ratio Test, a sample of each of the aggregates is obtained from the concrete plant immediately before the pouring starts. The amount of free water in the aggregates is found by drying out each sample to determine the percent of moisture. This percentage is applied to the total batch weight of the water. Each aggregate absorbs a certain amount of moisture which has little effect on the cement. For this reason, we subtract the percent of absorption from the total water in the aggregates to find the actual total of free water in the aggregates.

The weight of the free water in the aggregates is added to the weight of the water mixed into the concrete at the plant to arrive at the total free water in the concrete. This total is divided by the weight of the cement to get the water/cement ratio.

The water cement ratio is reported on Form IT 628. The example below is a condensed version of the calculations shown on the sample Form IT 628 located on page B-24.

Example:

Water in the aggregates	99.9 lbs
Water added at the plant	158.3 lbs
Sub total	258.2 lbs
Less Percent of Absorption	<49.8 lbs
Total Free Water	208.4 lbs

$$\frac{\text{Total Free Water}}{\text{Total Cement}} = \frac{208.4 \text{ lbs}}{564.0 \text{ lbs}} = 0.370 \text{ lbs/lb}$$

This water/cement ratio of 0.370 is well below 0.487 and no correction will be required. If our ratio had exceeded the maximum of 0.487, an additional amount of cement would have been required during the remainder of the current operation.

It should also be noted that when fly ash is used, its weight is included in the weight of the cement when determining the water/ cement ratio.

IT 652 State Form 37869R
Rev. 3/1/81
Division of Materials & Research
District Construction
District Testing
Project Engineer

YIELD, SLUMP, AND AIR CONTENT REPORT

District _____
Project No. _____
Structure No. _____

YEAR [ ][ ] – FIELD/LAB [0] – SUBMITTER [ ][ ][ ] – TEST NO. [ ][ ][ ][ ] Contract [ ][ ] [ ][ ][ ][ ]

Plant [1][ ][ ][ ] NAME & LOCATION _____ Type of Mix [1][ ][ ] DESCRIPTION

Spec. [ ][ ] 78–1978 SS–SUPP SPEC SP–SPEC PROV [ ][ ] MO [ ][ ] DAY [ ][ ] YR Purpose [ ][ ] 72–JOB CONTROL 75–INFORMATION 74–INDEPENDENT ASSURANCE [5] [9][9][9][8]

Today's Yardage [ ][ ][ ][ ][ ] [ ] C–cu. yds. conc. Y–sq. yds. conc. L–Linear ft. Report No. [ ][ ][ ][ ]

Remarks [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ] CLOSE Supplemental to [ ][ ] [0] [ ][ ][ ][ ] [ ][ ][ ][ ][ ]

TVR

Material	Type	Source	Basis for Use Number	Batch Wts. (Lb./Cu. Yd.)
Cement	02 [ ][ ][ ][ ]	03 [ ][ ][ ][ ][ ]	[ ][ ][0][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]	14 [ ][ ][ ][ ] C
Fine Agg.	04 [ ][ ][ ][ ]	05 [ ][ ][ ][ ][ ]	[ ][ ][0][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]	15 [ ][ ][ ][ ]
Coarse Agg.	06 [ ][ ][ ][ ]	07 [ ][ ][ ][ ][ ]	[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]	16 [ ][ ][ ][ ]
Water	[ ][ ][ ][ ]		[ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]	17 [ ][ ][ ][ ]
Admixture	**Type**	**Product Name**	**Total Batch Weight (Lb./Cu. Yd.)**	18 [ ][ ][ ][ ] B
Air Entraining	08 [ ][ ][ ][ ]	09 [ ][ ][ ][ ][ ]	Admixtures Must be from Approved list / Oz. of Admix. per 100 lbs. of Cement	19 [ ][ ][ ][ ]
Chemical	10 [ ][ ][ ][ ]	11 [ ][ ][ ][ ][ ]		20 [ ][ ][ ][ ]
Other	12 [ ][ ][ ][ ]	13 [ ][ ][ ][ ][ ]		21 [ ][ ][ ][ ]

YIELD TEST		
Station Number		
Time of Test		
Gross Weight (Lb.)	J	
Weight of Container (Lb.)	K	
Net Weight of Concrete (Lb.) = J - K =	D	
Container Factor = 1/Vol. =	F	
Unit Weight (Lb./Cu. Ft.) = DxF =	A 23	
Relative Concrete Yield = B/27A =	Y 24	
Cement Content (Lb./Cu. Yd.) = C/Y =	N	

AIR CONTENT TEST	
Station Number	
Time of Test	
Air Meter Used	
Mixing Time (Minutes)	
Temp. of Concrete (°F) (1)*	
Percent of Air-Gross	
Agg. Correction (%)	
Percent Air-Net 25	

SLUMP TEST	
Station Number	
Slump (2)* 26	

AGGREGATE PROPORTIONS	
Fine Aggregate %	
Coarse Aggregate %	

LINE	NAME I	NAME J	NAME K	AUTHORITY	ADD
5					

Water/Cement Ratio in Lb./Lb. (3) * 27 [ ][ ][ ][ ]

Comments:

Signature _____
Title _____

Foot Notes: * (1) Disregard temperature if the Percent of Air-Net is within the Specified Range.
(2) Slump should be measured to the nearest 0.25 inch.
(3) If Water/Cement Ratio is reported attach Form IT 628C.

2-1

YEAR	Last two digits of fiscal year are to be used.
SUBMITTER	Fill in submitter number. Project personnel shall use the project engineer's or supervisor's submitter number.
TEST N0.	To be assigned by the submitter. A new test number must be assigned to each report.
CONTRACT/PO N0. PREFIX	Insert RM, RT, RS, TX, R, B, T, M, etc. for contracts. Should only one space be required then leave second space blank.
NUMBER	Insert contract number m the right leaving blank spaces on the left.
PLANT	Fill in plant or concrete producer code number, and write the name and location in space provided.
TYPE OF MIX	Fill in type of mix code number and write description in space provided.
SPECIFICATION	Fill in applicable specification.
GATE SAMPLED	Fill in month (O1 for January), day (use an 0 in front for the first nine days and Year(Last two digits of calendar ;rear).
PURPOSE	Fill in appropriate number *which* best describes the reason for taking the sample.
QUANTITY REPRESENTED	Fill in the quantity represented, leaving blank spaces an the left side. Do not use fractions or decimals.
UNITS	Fill in code letter for the units of the quantity represented
REPORT N0.	Can be used by the submitter or sampler for a separate numbering system. (Numerical only)
SUPPLEMENTAL TO	If supplement to original report fill in the Year, Submitter, 6 Test No. of original report and attach to original report.
MATERIAL TYPE (02,04,06)	Fill in type code number and write type of material in spats provided.
SOURCE (03,05,06)	Fill in source code number and write source of material in space provided.
BASIS FOR USE NUMBER	*Fill* in the laboratory or field test number *which* approves *the number for use. (When not* available use submitter *number &* sample marking) .
MATERIAL WT. (14,15,16,17)	Fill in weight(in pounds) used of each material *to* make one cubic yard of concrete.
TOTAL MATERIAL. (18)	Fill in the total weight(in pounds) of material used to make one cubic yard of concrete.
_ADMIXTURE TYPE(08,10,1-7)	Fill in type cod: number and write ripe in space provided.
PRODUCT NAME: (09 ,11,1)	Fill in product code number and write product name in space provided.
OZ. OF ADMIX. (19,20,21)	Fill in ounces of admixture(added) for each 100 pounds of cement.
TEST RESULTS	Fill in the blanks with appropriate test information.
L:INE 5	Not to be used in field.

IT 652 State Form 37969R
Rev. 3/1/81
Division of Materials & Research
District Construction
District Testing
Project Engineer

YIELD, SLUMP, AND AIR CONTENT REPORT

District
Project No.
Structure No.

YEAR 82 – FIELD/LAB 0 – SUBMITTER 0713 – TEST NO. 00264 Contract B 12345

Plant 128 BURNSIDE, INC. SEYMOUR, IN (NAME & LOCATION) Type of Mix 1 CLASS C CONCRETE (DESCRIPTION)

Spec. 78 (78–1978; SS–SUPP SPEC, SP–SPEC PROV) MO 01 DAY 01 YR 82 Purpose 72 (72–JOB CONTROL, 75–INFORMATION, 74–INDEPENDENT ASSURANCE) 5 9998

Today's Yardage 21 C (C–cu. yds. conc., Y–sq. yds. conc., L–Linear ft.) Report No. 38

Remarks TVR CLOSE Supplemental to 0

Material	Type	Source	Basis for Use Number	Batch Wts. (Lb./Cu. Yd.)
Cement	02 0111	03 0001 LEHIGH CEMENT, MITCHELL, IN	0713 00263	14 564 C
Fine Agg.	04 2122	05 2564 SPRAY SAND & GRAVEL, SEYMOUR, IN	82 0 0724 00321	15 1261
Coarse Agg.	06 2435	07 2564 SPRAY SAND & GRAVEL, SEYMOUR, IN	82 0 0724 00331	16 1644
Water				17 221
Admixture	**Type**	**Product Name**	**Total Batch Weight (Lb./Cu. Yd.)**	18 3590 B
Air Entraining	08 8201	AIREntrain 09 8209 AMEX-2K AMERICAN ADMIXTURE CORP.	Admixtures Must be from Approved list / Oz. of Admix. per 100 lbs. of Cement	19 75
Chemical	10 8203	Type B 11 8231 POZZOLITH 122-R MASTER BUILDERS		20 300
Other	12	13		21

YIELD TEST		
Station Number		225+00
Time of Test		
Gross Weight (Lb.)	J	42.85
Weight of Container (Lb.)	K	8.09
Net Weight of Concrete (Lb.) = J - K =	D	34.79
Container Factor = 1/Vol. =	F	4.02
Unit Weight (Lb./Cu. Ft.) = DxF =	A 23	139.8
Relative Concrete Yield = B/27A =	Y 24	1.030
Cement Content (Lb./Cu. Yd.) = C/Y =	N	548

AIR CONTENT TEST		
Station Number		230+00
Time of Test		
Air Meter Used		
Mixing Time (Minutes)		
Temp. of Concrete (°F) (1)*		
Percent of Air-Gross		8.3
Agg. Correction (%)		1.0
Percent Air-Net	25	7.3

SLUMP TEST		
Station Number		210+00
Slump (2)*	26	3.25

AGGREGATE PROPORTIONS	
Fine Aggregate %	40.0
Coarse Aggregate %	60.0

Line	Max 1	Max 2	Max 3	Alternate	Add
5				/	

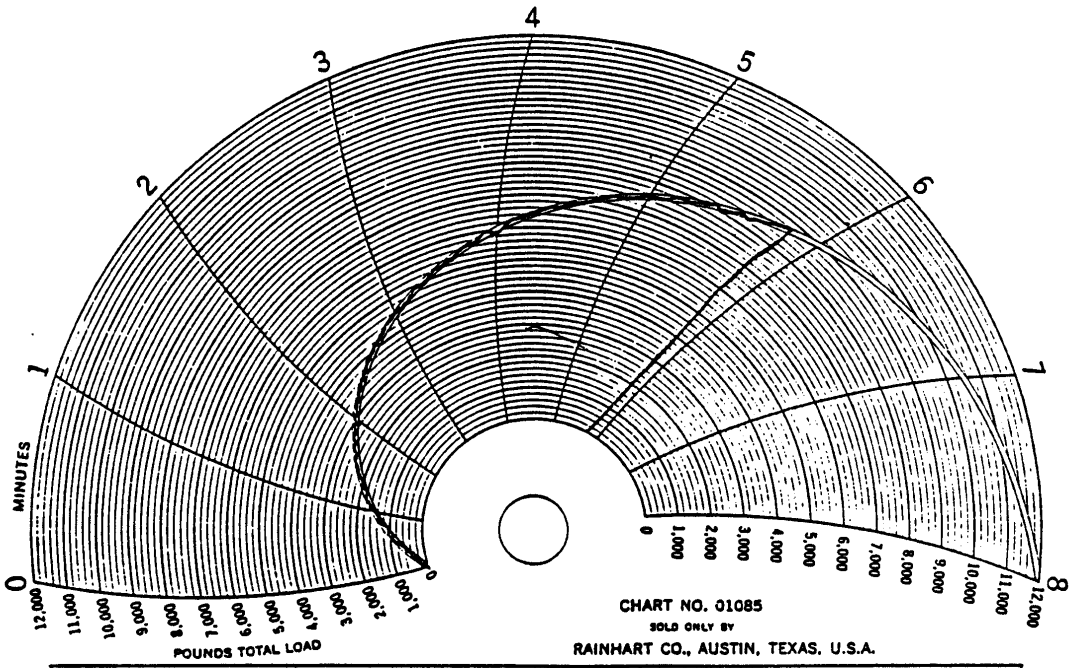
Water/Cement Ratio in Lb./Lb. (3)* 27 .485

Comments:

Signature Paul Smith
Title PE

Foot Notes: * (1) Disregard temperature if the Percent of Air-Net is within the Specified Range.
(2) Slump should be measured to the nearest 0.25 inch.
(3) If Water/Cement Ratio is reported attach Form IT 628C.

2-3



CONCRETE BEAM FLEXURAL STRENGTH TEST - A.S.T.M. PROCEDURE C78

CONTRACTOR Michael Const. Corp. PROJECT F-135-4(1)

BEAM NO. 1 MADE 9-11-81 TESTED 9-16-81 AGE 5 days

LOAD 8700 LBS., WIDTH 6 11/16 IN., DEPTH 5 15/16 IN., FACTOR .0842

FLEXURAL STRENGTH 733 PSI., SPECIFICATION 550 PSI.

REMARKS Approach Pavement
OK to open to traffic

TESTING AGENCY Ind. Dept. of Highways

TESTED BY J. L. Hedge

CHECKED BY L. Minnick

PRINTED IN U.S.A.

FORM I.T. 571A

State Form 21083R

FLEXURAL STRENGTH REPORT

CONT. No _____

PROJECT No _____ REPORT No. _____ _____, 19 ____

					COMPUTATIONS
Source of Coarse Agg.					
Source of Fine Agg.					
Brand of Cement					
Proportions					
Cement Content (bbl's./yd.^{3})					
Time of Mix					
Curing Method					
Ave. Curing Temp.					
Made at Station					
Testing Machine No					
Beam No.					
Date Made					
Date Broken					
Age at Test (days)					
"b" (width)					
"d" (depth)					
"P" (maximum load)					
"F" (factor)					
Flexural Strength psi					

REMARKS AND DECISION:—

COPIES TO

DIVISION OF MATERIALS & RESEARCH
DIVISION OF CNSTRUCTION
DISTRICT OFFICE
CONTRACT FILE

Form IT 628 Rev. 3/81 State Form 1756R

INDIANA DEPARTMENT OF HIGHWAYS
Water/Cement Ratio Report

bution:
v. Mat. & Research
District Engineer
Project File

Contract R-17566 Project _____ Date MAY 8, 1989

Cement Batch Wt. 564 lbs./yd.^{3} Max. permitted W/C 0.487 Lb./Lb.

	Weight		
	Sand	#8	#2
1. Recommended Minimum Sample Size in lbs.	3	5	8
2. Wet weight of sample (from stockpile) and container	4.20	6.35	
3. Dry weight of sample and container	4.09	6.19	
4. Amount of water (line 2) - (line 3)	0.11	0.16	
5. Weight of container	1.10	1.15	
6. Dry weight of sample (line 3) - (line 5)	2.99	5.04	
7. Percent moisture $\frac{\text{line 4}}{\text{line 6}} \times (100)$	3.7	3.2	
8. Percent absorption from Division of Materials & Research	2.0	1.50	
9. Batch weights in Lb./Cu. Yd.	1165	1880	
10. Dry batch weights $\frac{\text{line 9}}{\text{1.0+\% moisture as decimal}}$	1123	1822	
11. Free water in aggregates (line 10) $\times \frac{\text{(line 7) - (line 8)}}{100}$ if negative, water must be added to satisfy absorption requirements.	19.1	31.0	

12. Total free water in aggregates, sum of quantities on (line 11) 19.1+31.0	50.1
13. Water added at mixer in Lb./Cu. Yd. 19 GAL × 8.33 #/GAL	158.3
14. Total free water in mix (line 12) + (line 13) in Lb./Cu. Yd.	208.4
15. Water/Cement ratio Lb./Lb. $\frac{\text{line 14}}{\text{Cement Batch Wt. (Lb./Cu. Yd.)}}$ $\frac{208.4}{564}$ If line 15 does not exceed the specification limits, no adjustments are required. If line 15 exceeds the specification limits, the amount of water must be decreased or the amount of cement increased.	0.370
16. Total permitted water in Lb./Cu. Yd. (Cement Batch Wt.) x (Max. W/C)	274.7
17. Excess water in Lb./Cu. Yd. (Line 14) – (Line 16)	-66.3
18. Cement addition required $\frac{\text{Cement Batch Wt. (Lb./Cu. Yd.)}}{\text{line 16}} \times$ (line 17)	OKAY

REMARKS:

Signature Thomas Norman Title HEA III